Xiurui Zhao (赵修瑞)

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Research Interests

High Energy Process of Active Galactic Nuclei and Supermassive Black Holes

Appointments & Fellowships

University of Illinois Urbana-Champaign, Urbana, U.S. **2023-**
Post-Doctoral Research Fellow, advisor: Prof. Yue Shen

Center for Astrophysics | Harvard & Smithsonian, Cambridge, U.S. **2021-2023**
Post-Doctoral Research Fellow, advisor: Dr. Francesca Civano, Dr. Martin Elvis

Center for Astrophysics | Harvard & Smithsonian, Cambridge, U.S. **2020-2021**
Pre-Doctoral Fellow, advisor: Dr. Francesca Civano

Education

Clemson University, Clemson, U.S. **2016-2021**
Ph.D. in Astrophysics, advisor: Prof. Marco Ajello
Dissertation: *Heavily Obscured Active Galactic Nuclei in NuSTAR Era*

Lanzhou University, Lanzhou, China **2012-2016**
B.Sc. in Physics, Cuiying Honors College

Honors and Awards

Clemson University Outstanding Graduate Researcher Award (2 winners each year) **2021**
Clemson Science College Outstanding Graduate in Discovery Award **2021**
Clemson Physics Department Graduate Research Assistant Award **2021**
SAO Predoctoral Fellowship **2020-2021**
Clemson Graduate Student Travel Grant **2019, 2021**
Cuiying Honors College Abroad Study Fellowship **2014, 2015**

Accepted Scientific Proposals as PI

16 accepted X-ray/optical/sub-mm proposals with **$370k** grant as PI.

- **X-ray (1.6 Ms)**

- ***NuSTAR*** Cycle 9 (**Large**, 500 ks *NuSTAR* + 142 ks XMM, $130k) **2023**
  "Systematically Constraining the AGN Coronal Properties with NuSTAR Using a Sample of Luminous, High-redshift Quasars"

- ***NuSTAR*** Cycle 8 (**Large**, 600 ks *NuSTAR* + 195 ks XMM, $150k) **2022**
  "Constraining the Properties of AGN Coronae using a Sample of Luminous, High-redshift Quasars with NuSTAR"
- ***NuSTAR*** Cycle 8 (100 ks *NuSTAR* + 60 ks XMM**,** $90k) **2021**
  "Unveiling with NuSTAR the most powerful, heavily obscured, quasar ever discovered in X-rays"
- ***Swift***-XRT Cycle 19 (18 ks) **2022**
  "Building with Swift/XRT a Sample of Luminous, High-redshift Quasars to Constrain the Properties of AGN Coronae"
- ***Swift***-XRT ToO (3 ks) **2021**
  "Measure the X-ray flux of a rare coronal line event quasar exhibiting another optical flare"

● **Optical (5.5 nights)**

- **MMT** 6.5m Hectospec (0.3+0.3 night**,** 335 sources) **2023A & 2022B**
  "Complete the Hectospec Spectroscopic Survey of JWST NEP Time-Domain-Field"
- **MMT** 6.5m Binospec (0.1+0.1+0.1 night) **2023A & 2022B & 2022A**
  Monitoring a Coronal Line Event AGN
- **MMT** 6.5m Binospec (0.4 night) **2023A**
  Identify X-ray Bright Quasars and Constrain the AGN Coronal
- **SAO FLWO** 1.5m FAST (0.2 night) **2023A**
  Measure the Black Hole Mass of an X-ray Bright Quasar to Constrain Its Coronal Properties
- **SAO FLWO** 1.2m Keplercam (1+1+2 night, *g*, *r*, *i*) **2023A & 2022B & 2022A**
  "Monitoring the Continuous Optical Flares of a Coronal Line Event"

● **Sub-mm (3 tracks)**

- **Submillimeter Array** (SMA) standard science observation (3 tracks) **2022B**
  "Mornitoring with SMA a Highly Variable Flat Spectrum Radio Quasar in the JWST North Ecliptic Pole Time-Domain Field"

Collaboration & Professional Service

- Core Member of ***HEX-P*** Black Hole Growth & Corona Working Group **2022-**
- Member of *JWST* PEARLS Working Group **2022-**
- Member of ***NuSTAR*** Extragalactic Survey Team **2020-**
- Member of *Athena* Science Working Group **2020-**

+ Panelist for NASA ***NuSTAR*** Proposal Review **2022, 2023**
+ External reviewer for CFHT **2022A,B**
+ Reviewer for ApJ, A&A **2020-**

- Co-organizers of CfA High Energy Astrophysics Division Seminar **2021-2023**

Invited Talks

Caltech, Tea Talk	**May 2024**
Zhejiang University, Colloquium	**Sep 2023**
Peking University, KIAA-DoA Seminar	**Aug 2023**
Tsinghua University, Departmental Seminar	**Aug 2023**
UIUC, local group meeting	**May 2023**
Yale University, Galaxy Lunch Talk	**Apr 2023**
MIT, Brown Bag Lunch Talk	**Apr 2023**
NASA GSFC, X-ray Astrophysics Laboratory AGN Seminar (Virtual)	**Feb 2023**
CfA, High Energy Seminar	**Feb 2023**
Arizona State University, Cosmology Seminar	**Dec 2022**
University of Arizona, Steward Observatory/NOIRLab Galaxy group seminar	**Dec 2022**
MIT, High Energy Astro Group seminar (Virtual)	**Apr 2022**
Clemson University, Local Group seminar	**Apr 2022**
INAF OAS, Bologna, X-ray group seminar	**Sep 2019**

Conferences & Contributed Talks

High Energy Astrophysics Division 21th Meeting (*Contributed Talk*)	Texas, **Apr 2024**
High Energy Astrophysics Division 20th Meeting (*Contributed Talk*)	Waikōloa, **Mar 2023**
241st AAS Meeting (*Contributed Talk*)	Seattle, **Jan 2023**
NuSTAR 2022 Conference (*Contributed Talk*)	Italy, **June 2022**
New England Regional Quasar and AGN Meeting (*Contributed Talk*)	Storrs, **May 2022**
High Energy Astrophysics Division 19th Meeting (*Poster*)	Pittsburgh, **Mar 2022**
Black Hole Across Space and Time (*Contributed Talk*)	Virtual, **Dec 2021**
238th AAS Meeting (*Dissertation Talk*)	Virtual, **June 2021**
237th AAS Meeting (*Contributed Talk*)	Virtual, **Jan 2021**
Supermassive Black Holes Meeting (*Contributed Talk*)	Virtual, **Dec 2020**
235th AAS Meeting (*Contributed Talk*)	Honolulu, **Jan 2020**
X-ray Astronomy 2019 Meeting (*Poster*)	Bologna, Italy, **Sep 2019**
High Energy Astrophysics Division 17th Meeting (*Poster*)	Monterey, **Mar 2019**
233rd AAS Meeting (*Contributed Talk*)	Seattle, **Jan 2019**

Mentoring & Assistant Experience

Co-supervision of Clemson graduate student R. Silver	**2019-**
Co-supervision of Clemson graduate student A. Pizzetti	**2019-**
Co-supervision of Clemson undergraduate students D. Cole and Z. Hu	**2019**
Research Assistant, Clemson	**2018-2020**
Teaching Assistant (PHYS 2230), Clemson	**2016-2017**

Workshops & Schools

CSST summer school at Peking University — Beijing, China, **July 2023**
Summer School for Astrostatistics at Penn State — State College, **Jun 2023**
End-to-end Simulations with SIXTE Workshop — Virtual, **Mar 2022**
2022 Submillimeter Array Interferometery School — Virtual, **Jan 2022**
Winter School at University of Freiburg — Freiburg, Germany, **Feb 2015**
Summer School at University of California, Berkeley — Berkeley, **Jun-July 2014**

Press Release

Webb Glimpses Field of Extragalactic PEARLS, Studded With Galactic Diamonds **2022**

Outreach & DEI

† Volunteer to teach astronomy and mathematics to elemental and high school students in the rural area of China — Qiajia, **Summer, 2023**

† Translate Sensing Dynamic Universe project into Chinese (help people with visual disability accessible to the dynamic Universe with sonified astromical light curves and spectra) **2022-2023**

Publication List

A total of **25** peer-reviewed papers, **3** submitted papers **ADS**

- First-author papers

6) **X. Zhao**, F. Civano, C. N. A. Willmer et al., Accepted by ApJ
PEARLS: The NuSTAR and XMM-Newton extragalactic surveys of the JWST North Ecliptic pole Time-Domain Field II

5) **X. Zhao**, F. Civano, F. M. Fornasini, et al. 2021, MNRAS, 508, 5176
The NuSTAR extragalactic surveys of the JWST North Ecliptic pole Time-Domain Field

4) **X. Zhao**, S. Marchesi, M. Ajello, et al. 2021, A&A, 650, A57
The properties of the AGN torus as revealed from a set of unbiased NuSTAR observations

3) **X. Zhao**, S. Marchesi, M. Ajello, et al. 2020, ApJ, 894, 71
A broadband X-ray study of a sample of AGNs with [OIII] measured inclinations

2) **X. Zhao**, S. Marchesi, M. Ajello, 2019, ApJ, 871, 182
Compton-thick AGN in the NuSTAR Era. IV. A Deep NuSTAR and XMM-Newton View of the Candidate Compton-thick AGN in ESO 116-G018

1) **X. Zhao**, S. Marchesi, M. Ajello, et al. 2019, ApJ, 870, 60
Compton-thick AGNs in the NuSTAR Era. II. A Deep NuSTAR and XMM-Newton View of the Candidate Compton-thick AGN in NGC 1358

- Second/Third author or significantly contributed papers

10) F. Civano, **X. Zhao**, P. Boorman, et al., 2024, Front. Astron. Space Sci., 1340719
The High Energy X-ray Probe (HEX-P): X-ray population contributing to peak of the Cosmic X-ray background

9) E. Kammoun, et al. (including **X. Zhao**), 2024, Front. Astron. Space Sci., 1308056
The High Energy X-ray Probe (HEX-P): Probing the physics of X-ray corona in active galactic nuclei

8) N. Torres-Albà, M. Stefano, **X. Zhao**, et al., 2023, A&A, 678, A154
Hydrogen Column Density Variability in a sample of local Compton-thin AGN

7) R. Silver, N. Torres-Albà, **X. Zhao**, et al., 2023, A&A, 675, A65
A New Mid-Infrared and X-ray Machine Learning Algorithm to Discover Compton-thick AGN

6) R. Silver, N. Torres-Albà, **X. Zhao**, et al. 2022, ApJ, 940, 148
Compton-thick AGN in NuSTAR Era. IX: joint NuSTAR and XMM-Newton analysis of four local AGN

5) S. Marchesi, **X. Zhao**, N. Torres-Albà, et al. 2022, ApJ, 935, 114
Compton-Thick AGN in the NuSTAR era VIII: A joint NuSTAR-XMM-Newton monitoring of the changing-look Compton-thick AGN NGC 1358

4) R. Silver, N. Torres-Albà, **X. Zhao**, et al. 2022, ApJ, 932, 43
Chandra Follow-up Observations of Swift-BAT-selected AGNs II

3) N. Torres-Albà, S. Marchesi, **X. Zhao**, et al. 2021, ApJ, 922, 252
Compton-thick AGN in NuSTAR Era VI: The Observed Compton-thick Fraction in the Local Universe

2) S. Marchesi, M. Ajello, **X. Zhao**, et al. 2019, ApJ, 882, 162

Compton-thick AGNs in the NuSTAR Era. V. Joint NuSTAR and XMM-Newton Spectral Analysis of Three "Soft-gamma" Candidate CT-AGNs in the Swift/BAT 100-month Catalog

1) S. Marchesi, M.Ajello, **X. Zhao**, et al. 2019, ApJ, 872, 8
Compton-thick AGNs in the NuSTAR Era. III. A Systematic Study of the Torus Covering Factor

- **<u>Co-author papers</u>**

12) A. Pizzetti, et al. (including **X. Zhao**), Submitted to AAS journals
Hydrogen column density variability in a sample of local Compton-thin AGN II

11) R O'Brien, et al. (including **X. Zhao**), Submitted to AAS journals
TREASUREHUNT: Transients and Variability Discovered with HST in the JWST North Ecliptic Pole Time Domain Field

10) N. S. Khatiya, et al. (including **X. Zhao**), Submitted to AAS journals
Characterizing the γ-ray Emission from FR0 Radio Galaxies

9) P. Boorman, et al. (including **X. Zhao**), 2024, Front. Astron. Space Sci., 1335459
The High Energy X-ray Probe (HEX-P): Probing the circum-nuclear environment in AGN down to extremely low luminosities

8) I. Cox, et al. (including **X. Zhao**), 2023, ApJ, 958, 155
A simple method to predict N_H variability in active galactic nuclei

7) S. P. Willner, et al. (including **X. Zhao**), 2023, ApJ, 958, 176
PEARLS: JWST counterparts of micro-Jy radio sources in the Time Domain field

6) C. N. A. Willmer, et al. (including **X. Zhao**), 2023, ApJS, 269, 21
PEARLS: Near Infrared Photometry in the JWST North Ecliptic Pole Time Domain Field

5) Q. Yang, et al. (including **X. Zhao**), 2023, ApJ, 953, 61
Probing the Origin of Changing-look Quasar Transitions with Chandra

4) D. Sengupta, et al. (including **X. Zhao**), 2023, A&A, 676, A103
Compton-thick AGN in the NuSTAR Era IX: Analysis of seven local CT-AGN candidates

3) R. A. Windhorst, et al. (including **X. Zhao**), 2023, AJ, 165, 13
Webb's PEARLS: Prime Extragalactic Areas for Reionization and Lensing Science: Project Overview and First Results

2) A. Pizzetti, et al. (including **X. Zhao**), 2022, ApJ, 936, 149
A multi-epoch X-ray study of the nearby Seyfert 2 galaxy NGC 7479: Linking column density variability to the torus geometry

1) A. Traina, et al. (including **X. Zhao**), 2021, ApJ, 922, 159
Compton-Thick AGN in the NuSTAR era VII: a joint NuSTAR, Chandra and XMM-Newton analysis of two nearby, heavily obscured sources